



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/598,446	08/30/2006	Yasuharu Onishi	NEC 04P302	5323
27667 7590 07/31/2009 HAYES SOLOWAY P.C. 3450 E. SUNRISE DRIVE, SUITE 140 TUCSON, AZ 85718				
EXAMINER				
ELBIN, JESSE A				
ART UNIT		PAPER NUMBER		
2614				
MAIL DATE		DELIVERY MODE		
07/31/2009		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/598,446

**Applicant(s)**

ONISHI ET AL.

**Examiner**

JESSE A. ELBIN

**Art Unit**

2614

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 09 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) 4-6 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 7-12 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION**

***Response to Amendment***

1. The amendment filed June 15, 2009 has been entered.

***Election/Restrictions***

2. Applicant's election without traverse of Species III in the reply filed on 7 November 2008 is acknowledged.
3. Claims 4-6 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-3 and 8-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US Patent 5,062,139 ('139)) (already of record) in view of Williams (US Patent 2,284,462 ('462)) (already of record).

**Regarding claim 1**, Christensen teaches a piezoelectric acoustic element (Fig. 1A) using a piezoelectric element as a vibration source ("the piezo-electric bi-morph driver of the tweeter assembly"; '139 col. 4 lines 52-53), comprising: a hollow casing (e.g. Fig. 3B #16) having at least one opening (Fig. 3B at #40) and a side wall (Fig. 3B #16); a diaphragm provided at the opening of said casing (Fig. 3B #38); said side wall extending in a direction normal to a plane of the opening (*wherein the sidewall is illustrated as extending vertically, and the "plane of the opening" is illustrated as extending horizontally*) and normal to a surface of the diaphragm (e.g. *the surface at Fig. 3B #42 is illustrated as being parallel to the "plane of the opening"*); and a piezoelectric element (Fig. 3B #36) that is disposed in said casing (Fig. 3B), and attached at one end of said piezoelectric element in a longitudinal direction (Fig. 3B *illustrates the piezoelectric element #36 being attached at both ends*) to said side wall (#16) of said casing by a support member (Fig. 3B #32) for pivotal movement with respect to said support member about an axis through said support member, and that bends about said axis when a voltage is applied thereto ("the bi-morph disc will bend (flex) during excitation and any vibrations will be propagated [sic] outward of the center through the tweeter diaphragm"; '139 col. 5 lines 1-4).

Christensen does not explicitly teach said piezoelectric element and said diaphragm are joined through a vibration transmitting member.

In the same field of endeavor, Williams teaches said piezoelectric element (e.g. Fig. 8 #2) and said diaphragm (e.g. Fig. 8 #7) are joined through a vibration transmitting member (Fig. 8 #6) for the benefit of increasing "the ratio of acoustic output to applied voltage" ('462 p. 2 col. 1 lines 27-28).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the piezoelectric-to-diaphragm connection taught by Christensen by using the transmitting member taught by Williams for the benefit of increasing the ratio of acoustic output to voltage input.

**Regarding claim 2**, the combination of Christensen and Williams remains as applied above.

Christensen further teaches both ends of said piezoelectric element (Fig. 3B #36) in a longitudinal direction (i.e. horizontal as illustrated) are fixed to an inner surface of said side wall (Fig. 3B #16) of said casing through a respective support member (Fig. 3B #32).

**Regarding claim 3**, the combination of Christensen and Williams remains as applied above.

Williams further teaches said support member being elastic ("small blocks 3, 3 of soft material such as viscoloid or rubber"; col. 2 lines 18-19) for the benefits suggested

by Christensen ("the addition of the bi-morph disc coupling ring gives the engineer more opportunities to control the resonances of the bi-morph discs themselves, which results in a smoother and less 'peaked' frequency response"; '139 col. 19 lines 23-27).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a "viscoloid or rubber" support member as taught by Williams as the support ring taught by Christensen for the benefit of creating a smoother and less peaked frequency response.

**Regarding claim 8**, the combination of Christensen and Williams remains as applied above.

Williams further teaches said vibration transmitting member (Fig. 8 #6) being a spring ("ring 6 [is made] of yielding vibration conductive material such as viscoloid or rubber"; col. 3 lines 8-10).

**Regarding claim 9**, the combination of Christensen and Williams remains as applied above.

Neither Christensen nor Williams explicitly teaches said diaphragm being formed of a film selected from the group [consisting] of a polyethylene terephthalate film, a polyethersulfone film, a polyester film, and a polypropylene film.

Williams does teach the diaphragm being made "of suitable material such as Celluloid, aluminum, Bakelite, or mica" (col. 3 lines 10-12) wherein 'Bakelite' and 'Celluloid' are obsolete moldable resin materials, which were seldomly used at the time

of the invention. Aluminum and mica diaphragms are still used for their weather resistance and specific acoustic properties. As Williams does not limit the diaphragm to an exhaustive list of materials, and states that the diaphragm can be made "of suitable material"; one of ordinary skill in the art at the time of the invention would know to use a more modern "suitable material" as the diaphragm taught by Williams.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the material used by Williams as the diaphragm to use a more modern thermoplastic resin material with the specific acoustic properties required by the design specifications.

**Regarding claim 10**, the combination of Christensen and Williams remains as applied above.

Christensen further teaches an acoustic device (Fig. 1A) provided with the piezoelectric acoustic element according to claim 1 (*supra*).

**Regarding claim 11**, the combination of Christensen and Williams remains as applied above.

Examiner takes official notice that use of acoustic devices, including those made of piezoelectric acoustic elements, in "a portable terminal device" is well known in the art. While Christensen teaches a coaxial loudspeaker, wherein the piezoelectric element is meant to drive a 'tweeter' using the existing space within a louder loudspeaker, one of ordinary skill in the art could easily, with a minimal amount of

experimentation, incorporate the coaxial loudspeaker taught by the combination of Christensen and Williams into, e.g. a public address system, which are commonly "portable".

It would have been obvious to one of ordinary skill in the art at the time of the invention to use the loudspeaker taught by the combination of Christensen and Williams in a portable terminal as is well known in the art.

**Regarding claim 12**, the combination of Christensen and Williams remains as applied above.

Williams further teaches said vibration transmitting member (Fig. 8 #6) being elastic ("ring 6 [is made] of yielding vibration conductive material such as viscoloid or rubber"; col. 3 lines 8-10).

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Christensen (US Patent 5,062,139 ('139)) (already of record) in view of Williams (US Patent 2,284,462 ('462)) (already of record), as applied to claim 1 above, and further in view of Sawyer (US Patent Re 20,213 ('213)) (already of record).

**Regarding claim 7**, the combination of Christensen and Williams remains as applied above.

Williams further teaches use of a "piezoelectric bimorph unit 2...such as is disclosed in United States Letters Patent Reissue 20,213" (col. 2 lines 15-17).



In the same field of endeavor, Sawyer teaches a piezoelectric element having a laminated structure (e.g. Fig. 4) in which conductive layers (electrodes; e.g. Fig. 4 325-26) and piezoelectric material layers (crystal portions; e.g. Fig. 4 #17-18) are alternately laminated (e.g. Fig. 4) for the benefit of increasing the flexure of the piezoelectric element.

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a multi-layer piezoelectric element as taught by Sawyer in the acoustic device taught by the combination of Christensen and Williams for the benefit of increasing the flexure of the piezoelectric element.

#### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1-12 have been considered but are moot in view of the new ground(s) of rejection.
4. Applicant's arguments regarding the double patenting rejection, filed June 15, 2009 have been fully considered and are persuasive. The double patenting rejection of claims 1-3 and 7-12 has been withdrawn.

#### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JESSE A. ELBIN whose telephone number is (571)270-3710. The examiner can normally be reached on Monday through Friday, 9:00am to 6:00pm EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis Kuntz can be reached on (571) 272-7499. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/J. A. E./  
Examiner, Art Unit 2614  
/CURTIS KUNTZ/  
Supervisory Patent Examiner, Art Unit 2614